FEB/FY06

MILAN ARMY AMMUNITION PLANT

Tennessee

Army Defense Environmental Restoration Program Installation Action Plan

Final 7 July 2006

Table of Contents

Table of Contents 2
Statement of Purpose 3
Acronyms and Abbreviations 4

Installation Information 6
Cleanup Program Summary 8

Installation Restoration Program (IRP) 10
Summary 11
Contamination Assessment 12
IRP Active Sites 20
MAAP-003 Overall GW OU (Line A (SWMU 9) 21
MAAP-003A NI Soils OU (Line A (Bioremed) 23
MAAP-011 Line X (SWMU 9) 25
MAAP-014 O-Line Lagoon Groundwater (SWMU 10) 26
MAAP-014A OU2 O-Line Lagoon (Soils) SWMU 10 27
MAAP-017 Open Burning Grounds (SWMU 3) 29
MAAP-017A Open Burning Ground OU5 (Removal) 30
MAAP-034 EFF Drainage Ditches (Northern) (SWMU 8) 31
MAAP-035 EFF Drainage Ditches (Central) (SWMU 8) 32
PBC at Milan 33
IRP No Further Action (NFA) Sites Summary 34

IRP Schedule 36
IRP Costs 40

Military Munitions Response Program (MMRP) 41
Summary 42
Contamination Assessment 43
MMRP Active Sites 45
MAAP-001-R-01 Open Burning Grounds 46
MAAP-003-R-01 Sunny Slopes Area 47
MMRP NFA Sites Summary 48

MMRP Schedule 49
MMRP Costs 50

Community Involvement 51

Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year Cleanup Program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern, and proposes a comprehensive, installation-wide approach, with associated costs and schedules, to conduct investigations and necessary remedial actions (RAs).

In an effort to coordinate planning information between the restoration manager, US Army Environmental Center (USAEC), Milan Army Ammunition Plant (MLAAP), Army Materiel Command (AMC), HQ Joint Munitions Command (JMC), executing agencies, and the regulatory agencies, an IAP was completed. The IAP is used to track requirements, schedules and tentative budgets for all Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

The following agencies contributed to the formulation and completion of this IAP:

Company/Installation/Branch

ARCADIS

EEI for USAEC

MLAAP

Tennessee Department of Environment and Conservation (TDEC)

US Army Corps of Engineers (USACE)

USAEC

US Environmental Protection Agency (USEPA)

Acronyms

AAP	Army Ammunition Plant
AEDB-R	Army Environmental Database Restoration
ASR	Archive Search Report
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
DD	Decision Document
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DoD	Department of Defense
ESD	Explanation of Significant Differences
FADA	Former Ammunition Destruction Area
FRC	Flight Refueling and Countermeasures Incorporated
FS	Feasibility Study
FY	Fiscal Year
GW	groundwater
IAG	Interagency Agreement
IAP	Installation Action Plan
IRA	Interim Remedial Action
IROD	Interim Record of Decision
IRP	Installation Restoration Program
IWTF	Industrial Wastewater Treatment Facility
JMC	Joint Munitions Command
LAP	Load, Assemble, Package
LTM	Long-term Management
MAAP	Milan Army Ammunition Plant (as designated in AEDB-R)
MC	Munitions Constituents
MLAAP	Milan Army Ammunition Plant
MMRP	Military Munitions Response Program
NCP	National Oil & Hazardous Substances Contingency Plan
NFA	No Further Action
NI	Northern Industrial
NPL	National Priorities List
OBG	Open Burning Grounds
OU	Operable Unit
PA	Preliminary Assessment
PBC	Performance Based Contract
ppb	parts per billion
RA	Remedial Action
RA(C)	Remedial Action – Construction
RA(O)	Remedial Action – Operation
RAB	Restoration Advisory Board
RAC	Risk Assessment Code
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design

Acronyms

RDX	Royal Demolition Explosive (Hexahydro-1,3,5-trinitro-1,3,5-triazine)
REM	Removal
RI	Remedial Investigation
RIP	Remedy In Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SVOC	Semi Volatile Organic Compound
SWMU	Solid Waste Management Unit
TDEC	Tennessee Department of Environment and Conservation
TNT	2,4,6-trinitrotoluene
TRC	Technical Review Committee
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USATHAMA	United States Army Toxic and Hazardous Material Agency (currently called USAEC)
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance

Installation Information

Installation Locale: MLAAP is located in portions of Gibson and Carroll Counties in western Tennessee. The City of Milan lies immediately to the west of MLAAP. The site is approximately 50 miles east of the Mississippi River. MLAAP has a total size of 22,418.8 acres and is bordered on the northeast and east by land owned by the National Guard Bureau, on the west and northwest by land owned by the city of Milan and the University of Tennessee, and on the north and south by private farm land.

Installation Mission: MLAAP's mission is: 1) Load, assemble, and pack (LAP) medium and large caliber ammunition; 2) Receive, store and ship ammunition; 3) Provide storage surveillance function. MLAAP facilities include 10 ammunition LAP lines, 1 washout/rework line, 1 central X-ray facility, 1 test area, 2 shop maintenance areas, 12 magazine storage areas, demolition and burning grounds area, an administrative area, and a family housing area. In addition, there are seven industrial wastewater treatment facilities (IWTFs).

Lead Organization: AMC

Lead Executing Agency: US Army

Regulatory Participation
Federal: USEPA, Region 4
State: TDEC

National Priorities List (NPL) Status: NPL Effective Date: 21 August 1987
Interagency Agreement (IAG) Effective Date: 26 October 1989 (Amended 13 September 1991)

Projected Dates for Construction Completion: 2015

Projected Date for NPL Removal: 2015

Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation Status: The MLAAP RAB was established in 1994.

Installation Program Summaries

IRP

Primary Contaminants of Concern: Explosives, Semi-volatile Organic Compounds (SVOCs), Polyaromatic Hydrocarbons (PAHs), Inorganics
Affected Media of Concern: Soil, Groundwater
Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 2007/2026
Funding to Date (up to FY05): $144,865,000
Current Year Funding (FY06): $10,590,000
Cost-to-Complete (FY07+): $46,351,000

MMRP

Primary Contaminants of Concern: Unexploded Ordnance (UXO)
Affected Media of Concern: Soil
Estimated Date for RC: 2014
Funding to Date (up to FY05): $331,000
Current Year Funding (FY06): $0
Cost-to-Complete (FY07+): $9,843,000

Cleanup Program Summary

Installation Historic Activity

Of the 14 process areas active by the end of WW II only 9 lines (A, B, D, H, I, O, V, Z, and X) are in use today by the installation. In year 2002 Milan AAP signed a 10-year lease with Flight Refueling and Countermeasures Incorporated (FRC) to utilize inactive lines E & Z. FRC will manufacture flares and associated components for the Department of Defense (DoD), they began production in June 2004. FRC was sold in 2005 and will continue to operate under the name of ARMTEC Countermeasures. In the past, wastewater from various production activities in the lines was discharged to open ditches that drained from sumps or surface impoundments into both intermittent and perennial streams and rivers. Currently, MLAAP treats all process water from the lines that generate explosives-contaminated wastewater in the seven IWTFs. This wastewater is processed by activated carbon absorption systems and discharged under the authority of a Clean Water Act Permit.

In general, the mission of the plant has been to LAP, store, and ship ammunition items. Administrative support, storage and disposal facilities, as well as active and inactive production facilities, are dispersed among wooded areas and cultivated fields. The construction of the installation started in January 1941 and was completed in January 1942. The original land was 28,521.4 acres. Approximately 548 acres enclose the various production lines, and the storage areas total 7,930 acres. Other acreage is necessary to allow safe distances between explosive areas. In 1946 Line G, containing approximately 42 acres, was sold to the United States Rubber Company. Other tracts have been sold; some deeded to the city of Milan and the University of Tennessee and leased and/or transferred to the National Guard Bureau. The installation now contains 22,418.8 acres.

Current Activity:

MLAAP is a Government-owned contractor-operated facility with the primary mission to load, assemble, pack, ship, and demilitarize ammunitions items for the DoD.

MLAAP is a NPL site and is jointly regulated by the USEPA Region 4, and TDEC. An IAG, also referred to as the Federal Facility Agreement, was signed by the US Army, USEPA, and TDEC, and went into effect in 1989. The regulatory requirements for restoration at MLAAP are derived from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requirements.

The potential occurrence of UXO at the Operable Unit (OU)-5 areas may critically affect the cleanup schedule. Measures to mitigate or minimize this issue are underway.

Cleanup Program Summary

IRP

- Prior Year Progress: The characterization of all explosive contaminated soils within the Area was completed. Operations continued at each groundwater (GW) treatment plant. The Conceptual Site Wide Model for all GW sites was completed.
- Future Plan of Action: The final Record of Decision (ROD) for Site Wide Groundwater will be completed along with the delineation study of all off-post plumes. Operation of the GW treatment plants will continue. All remedies will be in place as required by the Performance Based Contract (PBC) no later than 2007.

MMRP

- Prior Year Progress: The Site Inspection (SI) was completed in December
- Future Plan of Action: The installation plans to execute follow on phases/actions as required in the individual site cleanup strategies.

MILAN AAP

Installation Restoration Program

Total Army Environmental Database – Restoration (AEDB-R) IRP Sites / AEDB-R sites with RC: 40/30

Different Site Types:
1 Contaminated Soil Pile
2 Surface Disposal Areas
2 Drainage Ditches
1 Firing Range
21 Industrial Discharges
3 Landfills
1 Storage Area
3 Surface Impoundment/Lagoons
1 Spill Site Area
5 Explosive Ordnance Disposal Areas

Most Widespread Contaminants of Concern: Explosives, UXO

Media of Concern: Soil, Groundwater

Completed Removal (REM)/Interim Remedial Action (IRA)/RA:

- Groundwater Pump & Treat System for O-Line (OU1)
- Groundwater Pump & Treat System for Northern Boundary (OU3)
- O-Line Ponds Surface Area Cap Extension (OU2)
- Contaminated Spill Site (Water Towers)
- Bioremediation facility & Contaminated Soil
- Contaminated Spill Site Y-103
- Groundwater Pump & Treat System for Western Boundary Site (OU4)

Total IRP Funding

Prior years (up to FY05):	$144,865,000
Current year funding (FY06):	$ 10,590,000
Future Requirements (FY07+):	$ 46,351,000
Total:	$201,806,000

Duration of IRP
Year of IRP Inception: 1976
Year of IRP RIP/RC: 2007/2026
Year of IRP Completion including Long-term Management (LTM): 2040

IRP Contamination Assessment

IRP Contamination Assessment Overview

Due to past practices at MLAAP, explosives mainly 2,4,6-trinitrotoluene (TNT), and Royal Demolition Explosive Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) have been identified as contaminants of concern in the soil and GW on post, with impact to off-post GW. The off-post GW contamination was significant enough for the Army to finance the construction of a new drinking water system and well field for the City of Milan. There is significant soil contamination in the industrial areas of the post that has led to significant volumes of GW contamination. Three GW treatment systems/remedies are in operation to address this contamination. Cleanup priorities will be to remove/remediate source areas soils and then remediate off-post GW contamination. MLAAP projects to have all sites with remedies in place by 2007.

In 1989 the US Army initiated a Remedial Investigation/Feasibility Study (RI/FS) program with the goal of identifying, evaluating, selecting, and implementing permanent remedies for the entire installation. Initially, the focus of response activities was on those sites perceived to have the greatest potential for causing off-site contamination. The interim RI, completed in December 1991, identified the O-Line Ponds study area as a continuing source of contamination, with sufficient data to plan a FS focusing on GW contamination. For the other major study areas, the interim RI identified the presence of potentially unacceptable contaminant migration, but additional source strength, contaminant transport, and fate data are required before feasible remedial alternatives can be considered.

All investigations and RAs at MLAAP will be conducted in accordance with the 1989 Federal Facility Agreement between the US Army, USEPA, and the State of Tennessee. Under this agreement, remedial response actions for past disposal areas and solid waste management units (SWMUs) will be determined in accordance with the provisions of the CERCLA, as amended, Resource Conservation and Recovery Act (RCRA) Section 3004 (u) and (v), RCRA Permit for MLAAP, and guidance contained in the NCP.

The IAP addresses the NPL site which includes all areas inside the installation boundary and all other areas off-post known to have contamination originating from sites on MLAAP. Data shows that GW contamination originates from numerous source areas. Levels above acceptable risk levels of Cyclotrimethylenetrinitramine (RDX) were detected in drinking water wells within the City of Milan (January 1994) and monitoring wells off-post to the west and north of the installation in four locations. Two of the locations are within the City of Milan and two of the locations are in farm land. There are 17 source areas under investigation which contribute to GW contamination plumes. Velocity of plumes vary, but direction is primarily north toward the Obion River and from the northwest boundary toward the city of Milan.

The installation restoration strategy is to separate the installation into OUs and/or major study areas which are:

OU 1 - Groundwater plume emanating from O-Line to the east of Ditch B.

OU 2 - O-Line ponds soils, sediments, and surface water at the O-Line ponds.

OU 3 - This unit consists of the remaining sources and GW contamination within the O-Line ponds basin which is not included as part of the OU1 and OU2 units. The east/west direction of OU3 extends from Line C to Line B in the south, and includes all areas between Line E and Line K in the north. Concerns include explosives sources and GW contamination associated with these sources.

OU 4 (Northern Study Areas) - This unit encompasses all aspects of GW contamination arising from residues due to past discharges emanating from LAP lines A, F, G, V, X, Z; Ditches 1, 2, D, E, F; Wolf Creek. These discharges have migrated west and northwest into the City of Milan. This unit is further broken down into two regions. Region 1 comprises A, X, and V Lines, and the northern plume migrating from Line X off-post into the City of Milan. Region 2 comprises Ditches E and F as they leave Line X to the southwest, the southern plume migrating from Line X off-post into the City of Milan, F, G, Z Lines, and Ditch D. Note that the boundaries of Region 1 and Region 2 may change as the northern and southern plumes migrate.

OU 5 (Southern Study Area) - This unit consists of all portions of the facility located south of Route 54. Suspected contaminant sources include: (1) Open Burning Ground, (2) Current Ammunition Destruction Area, (3) Former Ammunition Destruction Area (FADA), (4) Ammunition Test Area, (5) Closed Ammunition Burnout Area, (6) Ammunition Storage Areas, and (7) the Plant's five elevated potable water towers.

IRP Cleanup Exit Strategy

The overall strategy for meeting the IRP cleanup goals will be implemented as follows:

- OUs 3, 4 and 5 (Soils)
  - The soils at these OUs will be further delineated to refine the locations and quantity of media to cleanup
  - Upon delineation, the soils will be either removed and treated onsite at the fixed soil bioremediation (composting) facility or treated through *in situ* technology such as bioremediation
  - At those locations where in situ treatment or removal is not feasible, soil caps will be installed. A LTM program to maintain, inspect and document the performance of these caps will be implemented. The current LTM program for OU-2 will be incorporated into this program.

- OUs 1, 3 and 4 (Groundwater)
  - The in-situ bioremediation pilot test at the OU-1 GW plume will continue. The result of this test will be used to develop an Site-wide
  - Groundwater FS which will address the impacted GW at OU-3 and 4
  - The preferred remedy identified in the FS will be used to develop a Proposed Plan and ROD for site-wide GW. Remedial design (RD) and implementation of the remedy will be implemented upon approval of the ROD.
  - A long-term monitoring/operation program to maintain, inspect and document the performance of site-wide GW remedy will be developed and implemented.

Previous Studies

1978

- Installation Assessment of Milan AAP, PM for Chemical Demil and Installation Restoration, Jun-78.

1981

- MLAAP Contamination Survey prepared for US Army Toxic and Hazardous Materials Agency (USATHAMA), Envirodyne Engineers Inc, Sep-81.

1983

- Environmental Survey of MLAAP prepared for USATHAMA (3 volumes), Roy F. Weston Inc., Sep-83.

1986

- RCRA Facility Assessment Report for MLAAP prepared for USEPA Region IV, A.T. Kearney Inc., Aug-86.

1989

- Groundwater Contamination Survey Number 38-26-0881-88 Evaluation of SWMUs at MLAAP, Army Environmental Hygiene Agency, Feb-88.

1991

- RI Report of MLAAP (4 volumes) prepared for USATHAMA, ICF Technology Incorporated, Dec-91.

1992

- Focused FS for OU One Groundwater Treatment Alternatives, Prepared for USAEC ICF Technology Incorporated, Jun-92.

1993

- Treatability Study, Report for Groundwater Treatment Alternatives prepared for USAEC, ICF Technology Incorporated, Mar-93.
- Focused FS for OU Two prepared for USAEC, ICF Technology Incorporated, Jun-93.
- MLAAP RI Follow-on Northern Study Area Effluent Drainage Ditches Site Characterization Report prepared for USAEC, Environmental Resources Management, Inc. (ERM), Jul-93.
- Public Health Assessment for MLAAP, Agency for Toxic Substances and Disease Registry (ATSDR), Sep-93.
- Well Field Study-Preliminary Site Analysis for City of Milan Tennessee prepared for ERM, Smith Seckman Reid Inc., Dec-93.

1994

- MLAAP Northern Boundary Groundwater Focused FS prepared for USAEC, ICF, Jun-94.
- MLAAP preliminary Screening of Alternatives Report prepared for USAEC, ERM, Jun-94.

Previous Studies

1995

- FFS for Northern Industrial Area Soils prepared for USAEC, ICF, Apr-95.
- MLAAP Focused FS for the Northern Industrial Area Soil prepared for USAEC, ICF, Apr-95.
- Excavation and Removal of Lead Contaminated Soil and Debris from Around Five Elevated Water Towers prepared for MLAAP, MMOS, May-95.
- Focused FS Area Region 1 Groundwater Report prepared for USAEC, ERM, May-95.
- Focused FS OU4 Northern Study Area Region 1 Groundwater prepared for USAEC, ERM, May-95.
- RI of OU4 Northern Study Area prepared for USAEC, ERM, Aug-95.

1996

- RI Report Southern Study Area (OU No. 5) prepared for USAEC, Fluor Daniel, May-96.

1997

- Lead Contaminated Soil and Debris Removal Action Evaluation MLAAP Water Towers CERCLA Time Critical Removal Action prepared for USAEC, Fluor Daniel, Jan-97.
- Soil RI OU-3 and OU-4 Non-Industrial Areas MLAAP (Draft) prepared for USAEC, ESE, Feb-97.
- MLAAP Overall Groundwater Study, prepared for USACE, ICF, Apr-97.
- Offsite Groundwater, RI, MLAAP (Draft), prepared for USAEC, ESE, Apr-97.
- Final Post-Closure Care Plan OU-2 Cap Extension and O-Line Cap MLAAP, USAEC, Jul-97.
- Final Residential Well Survey Report, MLAAP, prepared for USAEC, QST, Sep-97.
- Final Proposed Plan (Salvage Yard, Former Burnout Area, and Sanitary Land Fill prepared for USAEC, ICF, Nov-97.

1998

- Investigation and Engineering Analysis for RAs at the MLAAP OBG prepared for the Huntsville Division Corps of Engineers, Post Buckley, Schuh & Jernigan Inc., Jan-98.
- Lead (Pb) Contaminated Soil and Debris Removal Action Evaluation Appendix: Selected Completion Alternative Implementation, prepared for USAEC, Fluor Daniel, Feb-98.
- Draft RI Report, MLAAP RI, Southern Area Study OU5, prepared for USAEC, Fluor Daniel, Mar-98.
- Performance Evaluation of OU One Groundwater Treatment Plant prepared for USACE, ICF, Jul-98.
- Final Soils RI OU3 and OU4 Non Industrial Areas (MLAAP), prepared for USACE, QST, Aug-98.
- Draft FS of Soil, RI, Non-Industrial Areas of OUs 3 and 4 MLAAP, prepared for USACE, QST, Nov-98.
- Offsite Groundwater RI Report, MLAAP, prepared for, USACE QST, Nov-98.
- Reinjection System Alternatives Evaluation and Pre-Design Report, prepared for USACE, ICF, Nov-98.

Previous Studies

1998, continued

- Evaluation of Human and Ecological Food Web Exposure Pathways Associated with Soil Contamination for Non Industrial Soil Areas of OU3 and OU4, prepared for USACE, QST, Dec-98.

1999

- Final RI Report, Southern Study Area (OU 5) MLAAP, OU 4 Region 1, prepared for USACE, Fluor Daniel, Feb-99.
- IRA, MLAAP prepared for USACE, IT, Feb-99.
- Final Offsite Groundwater RI MLAAP, prepared for USACE, QST, May-99.
- Proposed Plan for Treated Water Disposal OU 4 Region 1 MLAAP prepared for USACE, IT, Jul-99.
- Phase I Phytoremediation Treatability Study Report at MLAAP, prepared for USACE, ESE, Oct-99.
- Report on Line X Groundwater Investigation MLAAP, prepared for USACE, ICF, Oct-99.

2000

- FS for OU5 Southern Study Report at MLAAP, prepared for USAEC, ESE, Jan-00.
- Phytoremediation Treatability Study Report at MLAAP, prepared for USAEC, ESE, Mar-00.
- FS for the Ditch E/Wolf Creek Groundwater Plume MLAAP prepared for USAEC, ESE, May-00.
- MLAAP OU-3 Northern boundary Capture Zone Analysis Report, prepared for USAEC, IT, Jun-00.
- Final Record of Decision for OU-4 Region 1 at MLAAP, prepared for USACE, IT, Jul-00.
- MLAAP Overall Groundwater Study, RI prepared for USACE, IT, Aug-00.
- Final Treatability Study Report for Northern Industrial Area Soils at MLAAP prepared for USAEC, PLEXUS, Sep-00.
- Final Phase I/II Phytoremediation Treatability Study Report at MLAAP prepared for USACE, ESE,Oct-00.
- Final Proposed Plan for OU3/4 Non-Industrial Area Soils at MLAAP, ESE,Oct-00.
- Final Proposed Plan for OU3/4 Non-Industrial Area Soils at MLAAP prepared for USACE, ESE, Oct-00.
- Final 5-Year Review for MLAAP, prepared for USACE, ESE, Nov-00.
- Final Pilot-Study Report for In situ Chemical Oxidation of Ditch E/Wolf Creek Shallow Groundwater at MLAAP, prepared for USACE, ESE, Nov-00.
- Final RI Report for Overall Groundwater Study at MLAAP prepared for USACE, IT, Dec-00.

2001

- OU-4 Region 1 Explanation of Significant Differences (ESD) for Surface Discharges of Treated Water prepared for USACE, IT, May-01.
- Final FS for OU5 Southern Study Area, MLAAP prepared for USACE, ESE, Jun-01.
- MLAAP Overall Groundwater Study FS Rpt for Area M Groundwater prepared for USACE, IT, Jun-01.

2001, continued

- Final ESD for OU1 at MLAAP, prepared for USACE, ESE, Jul-01.
- Final Proposed Plan MLAAP OU5 Southern Study Area prepared for USACE, ESE, Jul-01.
- Interim Report Vadose Zone Investigation of Industrial Areas of OUs 3 and 4 at MLAAP prepared for USACE, ESE, Aug-01.
- Final Proposed Plan for Milan AAP OU-4 Regions 2 and 3 Ditch E Wolf Creek prepared for USACE, ESE, Nov-01.
- Groundwater Extraction Treatment Effectiveness Review prepared for USACE, PLEXUS, Nov-01.

2002

- MLAAP OU3, Northern Boundary, Screening-Level Ecological Risk Assessment for USACE, IT, Jun-02.
- Draft Vadose Zone Report Investigation of Industrialized Areas of OU-3 and 4 at MLAAP prepared for USACE, ESE,Aug-02.
- MLAAP Overall Groundwater Study FS Report prepared for USACE, IT, Aug-02.
- MLAAP OU3, Southern Boundary Report of Findings for Investigations South of Obion River OU-3 prepared for USACE, IT, Sep-02.
- MLAAP Overall Groundwater Study FS Report prepared for USACE, IT, Nov-02.
- MLAAP OU1 Capture Zone Analysis for December 2000 Data prepared for USACE, HSI GeoTrans, Dec-02.
- MLAAP OU1 Capture Zone Analysis for December 2001 Data prepared for USACE, HIS GeoTrans, Dec-02.
- MLAAP OU-3 Capture Zone Analysis for December 2001 Data prepared for USACE, HSI GeoTrans, Dec-02.

2003

- Final Report Time Critical Removal Action and Environmental Assessment for Y-103 Railroad Classification Yard, Petroleum-Contaminated Soils Site, AO, Jan-03.
- Milan AAP Overall Groundwater Study Area Proposed Plan prepared for USACE, IT, May-03.
- MLAAP OU4 Region 2 SI and Phase One Plume Characterization and OU1 Additional Groundwater Monitor Wells Draft Report prepared for USACE, CH2Mhill, Jun-03.
- MLAAP OU 4 Region 1 SI for Plume Delineation Final Document prepared for USACE, SAIC, Oct-03.
- MLAAP SI Report for Shallow Groundwater Plume Delineation for OU Four Regions 2 and 3 prepared for USACE, CH2Mhill, Oct-03.
- MLAAP OU4 Capture Zone Analysis for December 2002 Data prepared for USACE, HSI GeoTrans, Dec-03.

2004

- OU 3, Northern Boundary RI Addendum North of Obion River Draft Document, Data prepared for USACE, Shaw Group, Feb-04.
- SI Report for OU 4, Area M Plume Definition, Phase one, Data prepared for USACE, SAIC, Mar-04.

2004, continued

- Completion Report for Explosive Contaminated Soil, Industrial, Load, Assembly, Pack at Line H for MLAAP, AO, Apr-04.
- Southern Study Area Soils of OU 5 ROD Revised Draft Final Document, Data prepared for USACE, CH2Mhill, May-04.
- Vadoze Zone Investigation of Industrialized Areas of OUs 3 and 4 Final Report Data prepared for USACE, CH2Mhill, May-04.
- OU4 Region 2 Investigation and Phase One Plume Characterization and OU1 Additional Groundwater Monitoring Wells Revised Final Report, CH2MHILL, Jul-04.
- Phase One of the Line B Plume Characterization, CH2MHILL, Aug-04.
- Work Plan for the OU4, Region One Phase Two SI For Line X Plume Characterization at MLAAP Final Document, SAIC, Sep-04.
- Vadose Zone Investigation of Industrialized Areas of OUs 3 and 4 Revised Final Report, CH2MHILL, Sep-04.
- SI Report for Line A Plume Characterization at the MLAAP, SAIC, Sep-04.
- SI for Area M Plume Characterization, Phase One, SAIC, Sep-04.
- Draft Final OU5 Interim Record of Decision (IROD), ARCADIS, Sep-04.
- SI Report for Shallow Groundwater Plume Delineation OU 4, SAIC, Oct-04.
- Draft Interim Sitewide Groundwater Monitoring Workplan, ARCADIS, Oct-04
- OU5 Final Pilot Scale Test Work Plan, ARCADIS, Nov-04.

2005

- OU-2 Technical Memorandum - Amendment to Post-Closure Care Plan, ARCADIS, Jan-05
- Risk Assessment Technical Memorandum, ARCADIS, Jan-05
- Surface Water and Sediment Sampling Work Plan, ARCADIS, Feb-05
- Site-Wide Soils Characterization Work Plan, ARCADIS, Apr-05
- Technical Memorandum – Removal of Water Towers from OU-5, ARCADIS, Apr-05
- Area J - Proposed Sampling Locations and Analytical Methods, ARCADIS, Apr-05
- Line K Closure Report, ARCADIS, Apr-05
- Technical Memorandum - OU-3 and 4 Northern Industrial Soils - Alternate Capping Methods, ARCADIS, Apr-05
- Draft Site-wide Human Health and Ecological Risk Assessment Report, ARCADIS, Jun-05
- Technical Memorandum - OU-3 and 4, Amendment to Composting Curing Period and Analytical Requirements, ARCADIS, Jul-05
- Draft Groundwater Modeling Report, ARCADIS, Jul-05
- Technical Memorandum - CSM Support Additional Investigation Work Plan, ARCADIS, Aug-05
- Revised Interim Site-wide Groundwater Monitoring Work Plan, Nov-05
- OU-3 and 4, Draft Landfill Closure Report, ARCADIS, Nov-05
- OU-3 and 4, Draft Borrow Pit Closure Report, ARCADIS, Dec-05
- OU-3 and 4, Draft Line A Closure Report, ARCADIS, Dec-05
- Draft SI Report For Line X Plume, Dec 05, SAIC

MILAN AAP

Installation Restoration Program
Site Descriptions

MAAP-003
OVERALL GW OU (LINE A, SWMU 9)

LAP LINES & AREA – MAAP-003, 004, 005, 006, 007, 008, 009, 010, 012, 013, 014, 017, 034, 035

SITE DESCRIPTION

MLAAP facilities include fourteen ammunition LAP lines and areas, including the following: MAAP-003 (Line A), MAAP-004 (Line B), MAAP-005 (Line C), MAAP-006 (Line D), MAAP-007 (Line E), MAAP-008 (Line F), MAAP-009 (Line H), MAAP-010 (Line K), MAAP-012 (Line Z), MAAP-013 (Line O), MAAP-014 (Line O GW Treatment Plant, see page 21), MAAP-017 (Open Burning Ground, see page 24), MAAP-034 (Northern Study Area, see page 26) and MAAP-035 (Area M, see page 27). Past activities included renovation of artillery, mortar rounds and rocket components, loading of mortar rounds and rockets and the disassembly and assembly of howitzer shells. Past practices have caused GW contamination.

The GW for MAAP-011 is considered to be the overall source GW OU, but will be addressed separately to administratively accommodate tracking of off-post releases in OU 4 Region 1 and OU4 Region 2. The Final FS was completed in Nov 2002.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN: Explosives

MEDIA OF CONCERN: Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	200609
IRA	200407	200709
RA(C)	200610	200709
RA(O)	200701	202609
LTM	202610	204010

RIP DATE: 200709
RC DATE: 202609

Hardware modifications were made to all of the GW treatment plants in January 2005 to enhance automation and remote monitoring.

This site is being reevaluated as part of the development of the site wide GW FS.

MAAP-003

OVERALL GW OU (LINE A, SWMU 9) (PAGE 2 OF 2)

LAP LINES & AREA – MAAP-003, 004, 005, 006, 007, 008, 009, 010, 012, 013, 014, 017, 034, 035

CLEANUP STRATEGY

All these sites have been deemed to affect overall GW and a site-wide GW strategy is being developed to support a ROD. Ongoing GW monitoring and operations will continue.

The GW for MAAP-011 is being addressed separately, but is expected to be part of the final overall GW ROD, consistent with cleanup goals found in existing Final RODs.

MAAP-004, 005, 006, 010, 012, 014, 017, 034, 035 are listed as RC in AEDB-R in 200407.
MAAP-007, 008, 009, 013 are listed as RC in AEDB-R in 200209.

MAAP-003A

NI SOILS OU (LINE A, BIOREMED) (PAGE 1 OF 2)

LAP LINES & AREAS SOIL – MAAP-003A, 004A, 005A, 006A, 007A, 008A, 009A, 011A, 012A, 013A, 018A, 023A

SITE DESCRIPTION

MLAAP facilities include nine ammunition LAP line areas and three other sites including the following: MAAP-003A (Line A), MAAP-004A (Line B and I), MAAP-005A (Line C), MAAP-006A (Line D), MAAP-007A (Line E), MAAP-008A (Line F), MAAP-009A (Line H), MAAP-011A (Line X), MAAP-012A (Line Z), MAAP-013A (Line O), Area J and Line V. These lines are addressed in the OU3 and OU4 Non Industrial Area Soils ROD.

Past activities included renovation of artillery, mortar rounds and rocket components, loading of mortar rounds and rockets and the disassembly and assembly of howitzer shells. Past practices have caused soil contamination. The nine ammunition LAP line areas contain contaminated soil which serves as source areas for GW contamination. These soil sites include the sites listed above.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Medium

CONTAMINANTS OF CONCERN: Explosives, Metals, SVOCs

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	199504
RD	199610	199801
RA(C)	199804	199904
RA(O)	199505	200612
LTM	200701	203701

RIP DATE: 199904
RC DATE: 200612

A site wide soils characterization effort was started in November 2004 and completed in April 2005. Results of this characterization will be used to further refine remediation quantities at the outstanding lines. Contaminated soil has been removed and composted at MAAP-005A, 007A, 008A, 009A and 012A. Removal and composting at all lines is expected through 2006.

MAAP-18A (Closed Sanitary Landfill): Throughout its history, MLAAP has operated sanitary landfills for the disposal of reportedly non-hazardous materials. This landfill is located north of HWY 104 just west of Line K. It is ~3 acres in size. This landfill, now classified as the closed landfill, was operated from the 1960s until 1974 when it was closed.

Explosives were detected initially at levels warranting removal and composting of soils. Additional characterization conducted in 2005 indicated no impacts requiring further action. A draft closure report for this site was submitted for regulatory approval in November 2005.

MAAP-032A (Former Borrow Pit): The former borrow pit is located directly South of Line H and immediately North of highway 104. The pit was a former borrow area used to excavate sand for construction activities. MLAAP has allowed the disposal of discarded

building materials from base construction and renovation activities to occur in this pit. Currently, the former borrow pit contains ponded water.

Additional characterization conducted in 2005 indicated minimal impacts requiring limited removal and composting of soils. This removal action was performed in 2005 and a draft closure report for this site submitted for regulatory approval in December 2005.

Area J: Investigations conducted in January 2005 indicated that no explosives were detected, but other potential constituents were identified and are currently being evaluated. This site is located on HWY 104 on the southern side of the installation.

Line V: Investigations conducted in January 2005 indicated that no explosives were detected. NFA documents were submitted in July 2005 for regulatory review. Regulatory approval for NFA was received in late 2005.

CLEANUP STRATEGY

MAAP-003A, 004A, 006A, 011A & 013A: The soil will be tested and then the contaminated soil will be remediated. LTM will be required at some of these sites. MAAP-004A, 006A, 011A & 013A are listed as RC in AEDB-R – 200407.

MAAP-007A, 008A, 009A & 012A: Remediation has been completed and NFA is anticipated. These sites are listed as RC in AEDB-R – MAAP-007A & 009A in 200209, MAAP-008A in 200109, MAAP-012A in 200309.

MAAP-005A (Line C): Contaminated soil has been removed for composting and LTM is required (cap maintenance). This site is listed as RC in AEDB-R 200107

MAAP-018A (Closed Sanitary Landfill) & 032A (Former Borrow Pit): Contamination has been delineated and contaminated soil has been remediated where needed. NFA requests for these sites have been submitted. These sites are listed as RC in AEDB-R – 200407.

Area J: Investigations for non-explosive constituents are underway. The RA will be identified based on the results.

Line V: NFA documents were submitted in March 2005 – regulatory approval was received in late 2005.

MAAP-011
Line X (SWMU 9)

SITE DESCRIPTION

MAAP-011 addresses GW issues (OU4) only (see MAAP-003A for discussion on MAAP-011A for soils).

MAAP-011 past activities included renovation of artillery, mortar rounds and rocket components, loading of mortar rounds and rockets and the disassembly and assembly of howitzer shells. Past practices have caused explosive-contaminated GW.

There are two separate GW plumes in this site. The **Region 1** plume is a highly contaminated area (as high as 10,000 parts per billion [ppb]). The **Region 2** plume has considerably lower contamination (as high as 490 ppb). They have migrated off post and further delineation is necessary. The residents of Milan utilize a public water supply (funded by the Army) upgradient of the contamination, and are therefore not exposed to contaminated GW.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN:
Explosives

MEDIA OF CONCERN:
Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	200610
RD	199903	200610
RA(C)	200010	200709
RA(O)	200509	202509
LTM	202510	203109

RIP DATE: 200709
RC DATE: 202510

The construction of a pump and treat system for **Region 1** was completed and placed in operation in July 2002. The leading edge of the plume is not being captured by the pump and treat system. An off post site characterization study was conducted in 2005 to determine the vertical and horizontal extent of explosive contamination. Hardware modifications were made to all of the GW treatment plants in January 2005 to enhance automation and remote monitoring.

A pilot study using Fenton's reagent was completed in 2000. Based upon the results of the study, its use in remediating **Region 2** was recommended in the FS, to reduce contaminant levels such that potential exposures beyond city limits would be below acceptable risk levels. Recent preliminary results show that the areas of contamination which would require treatment are smaller than originally determined in the RI.

This site is being reevaluated as part of the site-wide GW FS.

CLEANUP STRATEGY

Region 1: An off post site characterization has been conducted and additional remediation to meet cleanup goals is under evaluation.
Region 2: The results of the OU1 in-situ bioremediation pilot test will be used to develop a site wide GW remedy.

MAAP-014
O LINE LAGOON GROUNDWATER (SWMU 10)

SITE DESCRIPTION

This unit consists of the explosives-contaminated GW emanating directly under and immediately downgradient of O-Line ponds. This unit is based on that area that contains the highest explosives concentrations. The Focused FS was finalized in June 1992. The ROD was signed on 30 September 1992 and outlined a pump and treat/reinjection system which removes the explosives from the GW. After operating the system for about a year, the system was modified with an ESD submission. Approval was obtained in January 1998, which allowed for more flexibility with regard to the operation of individual treatment system elements, which in turn has resulted in the avoidance of significant unnecessary operational costs, while still meeting established remediation goals.

Risk based levels were established for the off-post receptors. The 2001 ESD established an exit strategy based on these risk levels.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN: TNT, RDX

MEDIA OF CONCERN: Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	197803	199112
RD	199209	199311
RA(C)	199401	199603
RA(O)	199603	200407

RIP DATE: 199603
RC DATE: 200407

Hardware modifications were made to all of the GW treatment plants in January 2005 to enhance automation and remote monitoring.

An in-situ bioremediation pilot study began in March 2005 and is anticipated to continue through 2006. Results of this study will be used to develop the site wide GW remedy.

CLEANUP STRATEGY

This site is included in MAAP-003. The treatment system will continue to be operated and treatment duration will be based upon achievement of the levels established in the ESD. Redesign and re-evaluation (initiated at the installation-wide 5-year review) of the system is expected by FY06 to result in reduced operation, monitoring costs and duration.

MAAP 014A

OU2 O-LINE LAGOON (SOILS) (SWMU 10) (PAGE 1 OF 2)

SITE DESCRIPTION

The O-Line ponds have been separated into three OUs (OU 1, 2, 3) in order to facilitate the response action at the site. These OUs are made up of AEDB-R sites MAAP-014 and 014A. This is the most contaminated site on Milan AAP.

The O-Line area at MLAAP was built as part of the initial plant construction activity in 1941. It has operated since 1942 as an ordnance demilitarization facility. From the start, the major function of the line has been to remove explosives from bombs and projectiles by injecting a high-pressure stream of hot water and steam into the shells of the munitions. The types of explosives handled in the facility included TNT and RDX.

From about 1942 until 1978, wastewater contaminated with explosives was discharged from the O-Line washout operations through a series of baffled concrete sumps where cooling caused significant amounts of explosives to precipitate out of the waste stream. The collected explosives were periodically removed from the sumps and burned at the burning ground. The wastewater then ran through a series of 11 ponds prior to discharge to a drainage ditch.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN: TNT, RDX

MEDIA OF CONCERN: Surface Water, Sediment, Soil

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	199306
RD	199311	199407
RA(C)	199502	199707
LTM	199707	202907

RC DATE: 199707

The O-Line ponds were closed in 1984 by in-place containment with the concurrence of the Tennessee Department of Public Health and the USEPA. Containment was accomplished utilizing a clay cap with overlying layers of gravel and soil with grass cover. The containment was carried out pursuant to RCRA closure requirements (40 Code of Federal Regulations [CFR] part 265).

In May 1984, because of the level of contamination in the GW from the O-Line ponds, the installation was proposed for listing on the NPL. Final listing of the installation on the NPL became effective 21 August 1987.

This site contains MAAP-014A. Unit 014A consists of contaminated soil beneath and around the former 11 ponds and surface water and shallow sediments in the drainage ditch that flows along the east and north sides of the ponds. Through sampling and consideration of former site activities, the area of OU2 has been defined as consisting of the area that has been impacted by use and/or closure of the former ponds at O-Line. To be conservative, the boundary of this area has been identified as the fence that encircles

OU2 O-LINE LAGOON (SOILS) (SWMU 10)

the capped area, exclusive of the area south of the access road to the O-Line IWTF. The area of OU2 is approximately 582,000 square feet. The tributary of the drainage ditch (ditch 5) that flows along the east and north sides of the O-Line Cap, which received pond effluent while the ponds were in use and currently receives treated water from the O-Line IWTF, is included.

Levels of explosives exceeding the risk to GW action levels derived by modeling the contaminant concentrations in the vadose zone indicated the need for an action in the area surrounding the current ponds. The selected alternative was to extend the existing cap to include these surrounding soils and provide for long-term maintenance of the cap. The ROD was signed in September 1993. The design was completed in 3rd Qtr FY94, and the construction contract was awarded in 4th Qtr FY94. Construction was completed utilizing a geo-synthetic liner design.

CLEANUP STRATEGY

These sites will be inspected quarterly, annually reported and repairs made to any erosion problems which develop. Periodic maintenance will be performed as required.

MAAP-017
OPEN BURNING GROUNDS (SWMU 3)

SITE DESCRIPTION

The Open Burning Grounds (OBG) has been in use since the beginning of operations at the MLAAP in 1942. The OBG consists of approximately 180 acres and has been used for the destruction and disposal of reject munitions and explosive-contaminated wastes. Groundwater monitoring data has shown low but increasing levels of explosives contamination in GW from wells adjacent to the OBG. Three categories of wastes originating both on and off the MLAAP facility have been handled and continue to be handled at the OBG. They include bulk explosives; ordnance components, including defective ordnance items or components removed from inventory at storage depots; and wastes potentially contaminated with explosives, including boxes, crates, paper, rags, strapping, pallets, activated carbon from the IWTF, precipitated explosives from settling sumps, and cleaning solvents that may have come into contact with explosive materials. After a burn was completed, any combustion by-products were placed in natural gullies or excavated trenches.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN: TNT, RDX

MEDIA OF CONCERN: Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	200407

RC DATE: 200407

The OBG was considered as a potential contamination source when the preliminary contamination survey was performed. Results from the Final RI of the Southern Study Area (OU5) have identified GW contamination consisting primarily of explosive compounds originating from the OBG. Analysis of surface soils found them to contain explosives and represent the source for infiltration of contaminants. Because materials are now burned in pans rather than on the ground surface, the potential for further releases to soil has been minimized. The final Groundwater FS was completed in November 2002.

CLEANUP STRATEGY

This site is included in MAAP-003. MAAP-017 will be characterized and monitored as the contamination moves towards the installation boundary. RA may be required if monitoring demonstrates the need. There is some potential at this site for a GW remediation action at some point well into the future.

MAAP-017A
OPEN BURNING GROUND OU5 (REMOVAL)
(MAAP-017A & 033)

SITE DESCRIPTION

The OBG part of OU5 consists of 180 acres used for the destruction and disposal of munitions. Three categories of wastes originating both on and off the MLAAP facility have been handled and continue to be handled at the OBG. They include bulk explosives; ordnance components, including defective ordnance items or components removed from inventory at storage depots; and wastes potentially contaminated with explosives, including boxes, crates, paper, rags, strapping, pallets, precipitated explosives from settling sumps, and cleaning solvents that may have come into contact with explosive materials. After a burn was completed, any combustion by-products were placed in natural gullies or excavated trenches.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Medium

CONTAMINANTS OF CONCERN: TNT, RDX

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	200709
LTM	201510	202509

RC DATE: 200709

Results from the RI of the Southern Study Area (OU5) of surface soils found them to contain explosives and represent the source for infiltration to GW. The FS was complete in June 2001. An Interim ROD was issued in September 2004 which accommodated an in-situ bioremediation pilot test preceded by delineation and UXO clearance.

Areas of contaminated soil are continuing to leach to the GW. This GW (addressed as MAAP-017) contamination could reach the installation boundary at levels that are not acceptable. Furthermore, the plume area under the site may continue to increase in size for the foreseeable future. This plume is being evaluated in the sitewide GW remedy.

CLEANUP STRATEGY

Further delineation of soil contamination is underway as part of the site wide soils characterization effort initiated in November 2004 through 2005. Based on the results of the soil delineation the interim remedies identified in the Interim ROD will be implemented in 2006 preceded or in conjunction with UXO clearance.

Concerns regarding the potential for contaminants in the soil to leach and the GW remedy will be addressed under MAAP-003.

MAAP-033 is listed as RC in AEDB-R in 200407.

MAAP-034
EFF DRAINAGE DITCHES (NORTHERN) (SWMU 8)

SITE DESCRIPTION

This unit (OU 3) consists of the remaining sources and GW contamination within the O-Line ponds basin which are not included as part of the MAAP-014 (OU1) and MAAP-014A (OU2).

Concerns include explosives sources and GW contamination associated with these sources.

A Focused FS for contaminated GW at the installation boundary (a sub-unit of OU3) was finalized in June 1994, and the interim ROD was signed in September 1994 for the off-post portion of the OU. The ROD outlined a pump and treat system which removes the metals and explosives from the GW with discharge to Rutherford Fork. The design was completed in August 1996 and this project was awarded for construction in September 1996. Construction was completed in January 1999 and is currently in operation.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN:
TNT, RDX

MEDIA OF CONCERN:
Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	199412
RD	199601	199612
RA(C)	199701	199809
RA(O)	199810	200407

RIP DATE: 199810
RC DATE: 200407

A Capture Zone Analysis (January 2000) was conducted on the site and showed that the system was 80% effective. Studies in 2001, determined that no contamination was found on the north side or in the Rutherford Fork of Obion River.

Hardware modifications were made to all of the GW treatment plants in January 2005 to enhance automation and remote monitoring.

CLEANUP STRATEGY

This site will be addressed under MAAP-003. The treatment system will continue to be operated. MAAP-034 will be characterized and monitored as the contamination moves towards the installation boundary. Enhancements to the current RA(O) may be required if monitoring demonstrates the need.

MAAP-035
EFF DRAINAGE DITCHES (CENTRAL) (SWMU 8)

SITE DESCRIPTION

This site addresses explosives-contaminated GW west of MAAP-034, in Area M.

Concentrations of explosives have been detected at the boundary above Region 9 PRGs. A pilot study has been conducted at Line D to determine the effectiveness of in-situ biodegradation.

The FS was completed in spring 2001. This site is being reevaluated as part of the development of the site wide GW FS.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN: Explosives, Metals

MEDIA OF CONCERN: Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	200407

RC DATE: 200407

CLEANUP STRATEGY

This site is being addressed under MAAP-003.

A pilot test has been completed to determine the feasibility of in-situ biodegradation. The results of this test are being considered for the development of the site wide GW remedy.

PBC AT MILAN

SITE DESCRIPTION

This site was created to address funding information for the PBC for Milan AAP. The period of performance for this contract is ten years beginning 25 May 2004.

All of the sites at Milan are covered under an installation-wide PBC with the exception of technical support.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN: N/A

MEDIA OF CONCERN: N/A

Phases	Start	End
PA	200308	200308
RA(C)	200310	200709
RA(O)	200310	201409

RIP DATE: 200709
RC DATE: 201409

IRP NFA Sites Summary

AEDB-R #	Site Title	Documentation/Reason for NFA	NFA Date
MAAP-002	TEST AREA	Study Completed, No Cleanup Required.	200309
MAAP-004	OU4, REGION 1 (LINE B (SWMU 9))	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200407
MAAP-004A	LINE B (BIOREMEDIATION)	This site has been consolidated into MAAP-003A as part of the Northern Industrial (NI) Soils OU.	200407
MAAP-005	LINE C (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200407
MAAP-005A	LINE C (BIOREMEDIATION)	This site has been consolidated into MAAP-003A as part of the NI Soils OU.	200107
MAAP-006	LINE D (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200407
MAAP-006A	LINE D (BIOREMEDIATION)	This site has been consolidated into MAAP-003A as part of the NI Soils OU.	200407
MAAP-007	LINE E (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200209
MAAP-007A	LINE E (BIOREMEDIATION)	All required cleanup(s) completed.	200209
MAAP-008	LINE F (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200209
MAAP-008A	LINE F (BIOREMEDIATION)	All required cleanup(s) completed.	200109
MAAP-009	LINE H (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200209
MAAP-009A	LINE H (BIOREMEDIATION)	All required cleanup(s) completed.	200209
MAAP-010	LINE K (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200407
MAAP-011A	LINE X (BIOREMEDIATION)	This site has been consolidated into MAAP-003A as part of the NI Soils OU.	200407
MAAP-012	LINE Z (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200407
MAAP-012A	LINE Z (BIOREMEDIATION)	All required cleanup(s) completed.	200309
MAAP-013	LINE O (SWMU 9)	This site has been consolidated into MAAP-003 as part of the Overall GW OU.	200209
MAAP-013A	LINE O (BIOREMEDIATION)	This site has been consolidated into MAAP-003A as part of the NI Soils OU.	200407
MAAP-015	CLOSED BURNOUT AREA (SWMU 2)	Study Completed, No Cleanup Required.	199112
MAAP-016	AMMO DESTRUCTION AREA (SWMU 1)	Not Eligible for Environmental Restoration, Army/Base Realignment and Closure Funding.	200209

AEDB-R #	Site Title	Documentation/Reason for NFA	NFA Date
MAAP-018	CLOSED LANDFILL (SWMU 6)	Study Completed, No Cleanup Required.	200301
MAAP-018A	CLOSED LANDFILL (BIOREMEDIATION)	This site has been consolidated into MAAP-003A as part of the NI Soils OU.	200407
MAAP-019	PRESENT LANDFILL (SWMU 4)	Landfill has been closed under RCRA Subtitle D requirements and is presently under-going 30 year monitoring as required by law.	199112
MAAP-022	SALVAGE YARD (SWMU 11)	Study Completed, No Cleanup Required.	199211
MAAP-032	CONSTRUCTION DISPOSAL SITE (SWMU 7)	Study Completed, No Cleanup Required.	200210
MAAP-032A	CONSTRUCTION DISPOSAL SITE	This site has been consolidated into MAAP-003A as part of the NI Soils OU.	200407
MAAP-033	FORMER AMMUNITION DESTRUCTION AREA (SWMU 3)	This site has been consolidated into MAAP-017A as part of OBG OU5.	200407
MAAP-036	LEAD CONTAMINATION AT WATER TOWERS	This site has been consolidated into MAAP-014A as part of O-Line Lagoon OU2.	199707
MAAP-037	BUILDING Y-103 RAILROAD YARD	All required cleanup(s) completed.	200209

IRP Schedule

Initiation of IRP: 1976

Past Phase Completion Milestones

1978
- Preliminary Assessment (PA)/SI Initiation, 1-78
- PA/SI Completion, 6-78

1979
- RI Initiation O-Line Ponds, 2-79

1984
- IRA Cap O-Line Ponds, 6-84

1989
- RI Follow-On O-Line, 3-89

1991
- RI Completion O-Line Ponds, 9-91
- RI Northern Area Initiation, 10-91

1992
- FS O-Line Ponds, 6-92
- Interim Action ROD OU1, 9-92

1993
- RI Southern Area Initiation, 7-93
- ROD OU-2, 9-93
- RD O-Line Ponds GW, 10-93
- IRA O-Line Ponds GW Initiation, 11-93

1994
- RA Lead Contaminated Soils, 4-94
- FS North Boundary Area, 6-94
- RD O-Line Ponds Soil OU-2, 7-94
- RA City of Milan Drinking Water System Initiation, 9-94
- ROD Northern Boundary OU-3, 9-94
- IRA Water Main Extension Initiation, 9-94
- RA O-Line Soils Initiation, 11-94

1995
- FS Northern Industrial Area Soils, 4-95
- FS Northern Study Area - Region 1, 5-95
- RI Northern Study Area - All Regions, 8-95
- ROD Industrial Area Soils, 9-95
- RA Water Main Extension Complete, 12-95

IRP Schedule

1996
- IRA O-Line Ponds GW Completion, 3-96
- RD Northern Boundary Area OU-3, 3-96
- RA O-Line Ponds Soil Completion OU-2, 5-96
- RI Five Water Towers, 8-96

1997
- IRA Northern Boundary Area Initiation, 2-97
- RD Industrial Area Soil, 5-97
- RA Report OU-2, 7-97
- RA Report 5 Water Towers (NFA), 11-97

1998
- ROD (NFA) Salvage Yard, Burnout Area, Landfill, 1-98
- RA Industrial Area Soil (Initiation), 4-98
- RA City of Milan Drinking Water System Completion, 8-98
- RI Non-Industrial Area Soil, 9-98
- RI OU-4 Region 1, 11-98
- RI OU-4 Regions 2&3, 11-98

1999
- IRA Northern Boundary Area Completion, 1-99
- RA Industrial Area Soil (Completion), 1-99
- RI Southern Study, 2-99
- Five Year Review, 12-99

2000
- ROD OU-4 Region 1, 1-00
- Final FS Non-Industrial Area Soils, 3-00
- RD OU-4 Region 1, 8-00
- Draft ROD Non-Industrial Area Soils, 10-00
- Draft Final FS Southern Study Area, 11-00
- RA OU-4 Region 1 (Initiation), 11-00
- Final RI Overall Groundwater, 12-00

2001
- RA OU-4 Region 1 (Initiation), 3-01
- Final ROD Non-Industrial Area Soils, 4-01
- Final ESD OU1, 5-01
- Final ESD OU3/4, 5-01
- Final FS Overall Groundwater (Area M), 6-01
- Final FS Southern Study Area, 6-01
- Final Proposed Plan Southern Study Area, 7-01
- Draft FS Overall Groundwater (Other Plumes), 7-01
- Final FS OU-4 Regions 2/3, 9-01
- Draft Final ROD Southern Study Area, 11-01

IRP Schedule

2001, continued
- Final Proposed Plan OU-4 Regions 2/3, 11-01
- Draft ROD OU-4 Regions 2/3, 11-01

2002
- Draft Final ROD OU-4 Regions 2/3, 2-02
- Final ROD OU-4 Regions 2/3, 3-02
- Final FS Overall Groundwater (Other Plumes), 4-02
- Draft Final FS Overall Groundwater (Other Plumes), 5-02
- Draft Final FS Overall Groundwater (Other Plumes), 6-02
- Draft RI Additional GW Investigation OU-3, 6-02
- Final RI Additional GW Investigation OU-3, 7-02
- Draft FS Additional GW Investigation OU-3, 7-02
- Draft Proposed Plan Overall GW (Other Plumes), 7-02
- Draft Final Proposed Plan Overall GW (Other Plumes), 9-02
- Final FS Additional GW Investigation OU-3, 9-02
- Final Proposed Plan Overall GW (Other Plumes), 11-02
- Draft ROD Overall Groundwater (Other Plumes), 11-02
- Final FS Overall Groundwater (Other Plumes), 11-02
- Final ROD Southern Study Area, 12-02
- Draft Proposed Plan Overall GW (Other Plumes), 12-02

2003
- RD OU-4 Region 2/3, 2-03
- Draft Final ROD Overall GW (Other Plumes), 3-03
- RD Southern Study Area, 4-03
- Draft Final Proposed Plan Overall GW (Other Plumes), 5-03
- Final Proposed Plan Overall GW (Other Plumes), 5-03
- Final ROD Overall Groundwater (Other Plumes), 6-03
- RA OU-4 Region 2/3 (Initiation), 6-03
- Draft ROD Overall Groundwater (Other Plumes), 7-03
- Draft Final ROD Overall GW (Other Plumes), 10-03
- Final ROD OU-4 Regions 2/3, 10-03
- Final ROD Southern Study Area, 12-03
- RD OU-4 Region 2/3, 12-03

2004
- IROD OU5, 9-04

2006 (projected)
- Draft FS Overall GW, 3-06
- Draft Proposed Plan Overall GW, 6-06
- Draft ROD Overall GW, 6-06
- Final FS Overall GW, 6-06
- Final Proposed Plan Overall GW, 8-06

2006 (projected), continued
- Final ROD Overall GW, 9-06
- Draft RA Completion Report, OU3/4 Soils, 11-06

Projected ROD/Decision Document (DD) Approval Dates: 2007

Projected Construction Completion Date of IRP and Removal from NPL: 2007 & 2015

Schedule for Next Five Year Review: 2010

Estimated Completion Date of IRP (including LTM phase): 2040

Milan Army Ammunition Plant IRP Schedule

(Based on current funding constraints)

AEDB-R#	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
MAAP-003	RA(C)									
	RA(O)									*202609*
	LTM									*204010*
MAAP-003A	LTM									*203701*
MAAP-011	RA(O)									*202509*
	LTM									*203109*
MAAP-014A	LTM									*202907*
MAAP-017A	LTM									*202509*
PBC at Milan	RA(O)									

Prior Years Funds

Total Funding up to FY04: $136,499K

FY05	MAAP-003 – RA(O)	$36K	
	MAAP-003 - RI	$28K	
	MAAP-011 – RA(O)	$80K	
	MAAP-011 – RA(C)	$53K	
	PBC at Milan – RA(O)	$8,169K	**$8,366K**

Total Prior Year Funds: $144,865K

Current Year Requirements

Year	Site Information	Requirements	FY Total
FY 06	MAAP-003 - RA(O)	$90K	
	MAAP-011 - RA(O)	$73K	
	PBC at Milan - RA(O)	$10,427K	**$10,590K**

Total Requirements FY06: $10,590K

Total Future Requirements: **$46,351K**

Total IR Program Cost *(from inception to completion of the IRP):* **$201,806K**

MILAN AAP

Military Munitions Response Program

MMRP Summary

Total AEDB-R MMRP Sites / AEDB-R Sites with RC: 3 **/** 1

AEDB-R Site Types
2 Open Burn 1 Small Arms Range

Most Widespread Contaminants of Concern: UXO

Media of Concern: Soil

Completed REM/IRA/RA: None

Total MMRP Funding

Prior Years (up to FY05):	$ 331,000
Current Year (FY06):	$ 0
Future Requirements (FY07+):	$ 9,843,000
Total:	$10,174,000

Duration of MMRP
Year of MMRP Inception: 2003
Year of MMRP RC: 2014
Year of MMRP Completion Including LTM: 2047

MMRP Contamination Assessment

The DoD has established the MMRP under Defense Environmental Restoration Program (DERP) to address DoD sites with munitions and explosives of concern including UXO, discarded military munitions (DMM), and munitions constituents (MC).

The United States (US) Army's (Army) inventory of Closed, Transferring, and Transferred Military ranges and sites, has identified sites eligible for action under MMRP.

The MMRP eligible sites include other than operational ranges where UXO, DMM and MC is known or suspected and the release occurred prior to September 30, 2002. Properties classified as operational ranges are not eligible and, therefore, are excluded from the MMRP program.

The MMRP began in the late 1990s as a result of key drivers such as processes outlined in the NCP (NCP – 40 CFR 300) as authorized by the CERCLA, 42 US Code (USC.) 9605, as amended by the SARA, Pub. L. 99-499.

The process began with three phases of range inventories. Phase 1 consisted of installations completing an initial data call. USAEC managed the implementation Phases II and III of the MMRP inventory.

The Phase II inventory dealt with active and inactive range considerations. The Phase III Army Range Inventory was completed at the MLAAP in September 2003. The inventory identified three sites as eligible for the MMRP, the Open Burning Ground. The Phase 3 inventory serves as the PA under CERCLA. A Site Inspection started in FY04 and the report was completed in Dec 05.

MMRP Cleanup Exit Strategy:

For MAAP-001-R-01 and MAAP-003-R-01, additional RI is planned. RD and RA, including the excavation and disposal of contaminated soils, may be needed. LTM may include OE Institutional Controls and OE Monitoring.

MMRP Previous Studies

Previous Studies

2003

- PA, MALCOLM PIRNIE, November 2004

2005

- Final Site Inspection, MLAAP, Malcolm Pirnie, December 2005.

MILAN AAP

Military Munitions Response Program Site Descriptions

MAAP-001-R-01
OPEN BURNING GROUND

SITE DESCRIPTION

The Open Burning Grounds (OBG) is 263 acres, including the 15 acres of the FADA, located in the eastern-central portion of the installation. The OBG was used for the destruction and disposal in trenches of reject munitions and explosive contaminated wastes between 1941 and 1983. Munitions returning from overseas following World War II (fuzes, mortar rounds, and rocket warheads) were disposed in FADA. A RI/FS was performed in 2001 for the OBG to address soil, sediment, and GW contamination. The OBG, with the FADA, is the most significant source of explosive compounds contaminating GW at the installation. The FS mentions the presence of UXO, but does not evaluate removal of UXO. Current cost-to-complete includes cleanup of MC, but not UXO. The OBG has one AEDB-R Site ID for GW (MAAP-017) and one for soil (MAAP-017A). The FADA is MAAP-033 and adjoins the OBG.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 3 - Moderate

CONTAMINANTS OF CONCERN: UXO

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	200302	200309
SI	200405	200512
RI/FS	200810	200909
RD	201210	201304
RA(C)	201305	201404
LTM	201710	204709

RC DATE: 201404

The Archive Search Report (ASR) and the SI were funded in FY04 and completed Dec 2005.

CLEANUP STRATEGY

Current IRP cost-to-complete includes MC but not UXO. Additional RI is planned. RD and RA, including the excavation and disposal of contaminated soils, may be needed. LTM may include OE Institutional Controls and OE Monitoring.

MAAP-003-R-01
SUNNY SLOPES AREA

SITE DESCRIPTION

Sunny Slopes, also known as Closed Burning Grounds (MMAP-015, RCS 1383 #171E-2 according to the 1985 IAP) is located within Area V in the western portion of the installation. The site is approximately nine acres based on aerial photo review. Other documents place the size at 15 acres. There is an operational pistol range used by the installation security forces for training that utilizes about 10,000 square feed of area. The site is located just south of Route 2 and contains a number of concrete aprons, barricaded buildings, an earth-covered storage magazine and a shed. The site was used from the 1940s to the 1950s to burnout large projectiles in a cement containment area. All wastes from burning were reported to have been removed from the site.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 3 - Moderate

CONTAMINANTS OF CONCERN: UXO

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	200302	200309
SI	200405	200512
RI/FS	200810	200909
RD	201210	201304
RA(C)	201305	201404
LTM	201710	204709

RC DATE: 201404

The ASR and the SI were funded in FY04 and completed Dec 2005.

CLEANUP STRATEGY

MC at site is managed under the IRP. Additional RI is planned. RD and RA, including the excavation and disposal of contaminated soils, may be needed. LTM may include OE Institutional Controls and OE Monitoring.

MMRP NFA Sites Summary

AEDB-R #	Site Title	Documentation/Reason for NFA	NFA Date
MAAP-002-R-01	Machine Gun Range	This site was made RC after the Site Inspection that was completed in Dec 2005.	200512

MMRP Schedule

Initiation of MMRP: 2003

Past Phase Completion Milestones

2003
• PA Completion for MAAP-001-R-01, MAAP-002-R-01, and MAAP-003-R-01

2005
• SI Completion for MAAP-001-R-01, MAAP-002-R-01, and MAAP-003-R-01
• RC for MAAP-002-R-01

Projected ROD/DD Approval Dates: 2014

Projected Construction Completion: 2014

Schedule for Five Year Reviews: 2019

Estimated Completion Date of MMRP including LTM: 2047

Milan Army Ammunition Plant MMRP Schedule

(Based on current funding constraints)

AEDB-R#	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
MAAP-001-R-01	RI/FS									
	RD									
	RA(C)									
	LTM									*204709*
MAAP-003-R-01	RI/FS									
	RD									
	RA(C)									
	LTM									*204709*

Prior Years Funds

Total Funding up to FY04: $260K

Year	Site Information	Expenditures	FY Total
FY 05	SI	$71K	**$71K**

Total Prior Year Funds: $331K

Current Year Requirements

Year	Site Information	Requirements	FY Total
FY 06		$0	**$0**

Total Requirements FY06: $0

Total Future Requirements: **$9,843K**

Total Program Cost *(from inception to completion of the MMRP):* **$10,174K**

Community Involvement

In June 1994 (FY94), MLAAP canvassed its surrounding communities for interest in establishing a RAB. After all efforts were completed, 16 community members expressed an interest in serving on a RAB. An official RAB was established in July 1994, and the first meeting was held in August 1994.

The surrounding community for MLAAP includes the towns of Milan (population 7,600), Atwood (population 1,100), Medina (population 700), and the community of Lavinia (population 300). MLAAP had a TRC prior to formation of the RAB with one member representing the general public/community and one member representing the City of Milan.

Efforts Taken to Determine Interest

MLAAP conducted the following to determine potential interest in establishing a RAB:
(1) Asked the TRC community member and the City of Milan TRC member if they were interested in serving on a RAB in lieu of a TRC. Also asked a frequent observer of the TRC meetings if he was interested in serving on a RAB.
(2) Mailed out letters to individuals, civic, community, and professional organizations. Included a fact sheet explaining what a RAB is and an Application/Survey to determine community concerns and participation interest.
(3) Placed public notices for two weeks in four local newspapers including the weekly papers for Milan, McKenzie, and Huntingdon, TN, and the daily Jackson, TN, paper. The notice explained the purpose of a RAB, invited the public to a meeting concerning formation of a RAB, and requested applicants for membership.
(4) Press releases were issued to local newspapers, radio stations, and TV stations which provided the same information as for the public notices.
(5) Held a public meeting to inform the public about the RAB. There was an orientation, a question and answer session, and a display of MLAAP's environmental projects and concerns.

Results

(1) The TRC community member and the City of Milan TRC representative volunteered to become RAB members and were requested to submit applications. The TRC frequent observer also volunteered and submitted an application.
(2) Twelve members of the local communities attended the public meeting. Eight applications for membership were brought to the meeting. Eight other applications were mailed and/or hand carried to MLAAP representatives.

Conclusions

Based on the results of the above efforts, 15 applications for community membership and one local City of Milan representative were obtained. A selection panel consisting of the former TRC community member, the City of Milan representative, and the observer were chosen to review the applications. As a result, all 16 members were approved for RAB membership.

The 16 community members represented a diverse community group which consisted of two doctors, a chemist, two environmental specialists from local industry, three members of minority groups, a former MLAAP Commander, and representatives from civic, professional, and local Government organizations.

The total original RAB membership was 21 which consisted of the 16 community members and five Government representatives [two MLAAP Army representatives (Commander and Environmental Coordinator)] and one each representative from the USEPA, the Army Environmental Center, and TDEC.

Milan AAP has a Community Relations Plan.

Follow-up Procedures
The MLAAP RAB has been successful in keeping the public involved in its Installation Restoration Program. Several community members have resigned or their membership terminated. Six new community members were recruited in early 1996 based on the recommendations and approval of the remaining community members.

There are eight members currently and the Board meets once per quarter. Current guidelines published on the RAB are being used for all RAB activities.